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ABSTRACT

The WARD model, developed by Williamson, Anderson, Rushing and Dahl, for conceptualizing hyperactive behavior is presented. The assessment system for measuring hyperactivity utilizes a mobile, portable digital logic system. This system controls a basic vigilance task, which provides a measure of attentional deficits, and a movement/stable metric chair, which provides a measure of motor restlessness. These measures are compared to teacher observation of hyperactivity using the Connors Teacher Rating scale. Teachers appear to be making fairly accurate judgments about children seen as disruptive in the classroom; most of them actually test out as hyperkinetic. Family background and ethnic variables are discussed. Comparisons of White, Black, and Mexican-American children suggest that social learning influences overt expression vs. inhibition of restless tendencies. Comments regarding long-term success of drug therapy are also included. (Author/MV)

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Relationship Between Performance Based and Observor Based Measures of Hyperactivity*

(Trends in Research with Hyperactive Children; Texas Tech University)

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Our purpose today is to update the program of research in hyperkinesis at Texas Tech University. We are aware that many of you are familiar with our efforts along the lines of objective measurement of hyperactivity and attentional deficits with a laboratory based, computer locked, vigilance task. In addition to assessment, we have also become involved in the modification of hyperactive behavior patterns within school settings.

Last year at SWPA we reported the work of Sherman (1977), and the pilot work carried out with Williamson and Sherman (Anderson, Sherman, & Williamson, 1976; Williamson, Anderson and Sherman, In press). Basically these studies demonstrated that it was possible to take extremely hyperactive youngsters and train them to pay attention using a system of feedback for non-attending behavior.

Now, we would like to pick up from there and show you where we have been this past year and where we are going.

One of the things we have come up against in a series of studies is the need to organize the massive literature in the field. Perhaps more

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importantly we have felt the need to conceptualize a viewpoint regarding the multi-dimensional, interactional nature of hyperkinesis.

The WARD model (Fig 1) represents the systems approach we have developed to meet these needs. There are three major systems acting to influence the behavioral output of the child. They are: 1) the family environment, 2) the educational environment and 3) the internal environment of the child.

The family environment provides a setting for shaping hyperactive behavior patterns. The parent-child relationship, sibling relationships, family life style, educational and social class level of the parents are all factors which provide an influence on the family group and ultimately the behavior of the child designated as the hyperkinetic one.

At five or six the child starts in the school bound educational process. What happens to his/her hyperactive potentials is markedly affected by the school environment. Factors which seem important in considering the behavior of the child include the administrative policies of the school, e.g., open space vs. traditional, the teaching approach and the physical facilities, e.g., lighting. Other factors which must be considered include the teacher-child, and peer relationships.

The third major environment acting on the system is provided by the internal status of the child. Thus, the physical, maturational, neurological condition of the child obviously affects behavioral output. In addition, the role of hereditary factors appears to be related to hyperactive potentials. Finally, there is some evidence that intellectual development may be another factor in etiology and the type of treatment approach which is used.

These three environments interact and influence how the child evaluates experience. From this the child's phenomenal self, or life style if one is

an Adlerian, evolves. We see this as a developmental process in that the child's current perceptions are influenced by past experience. However, it is also considered as an on-going, present, existential system in that the child responds to the current environments.

The behavioral output is the observable aspect of hyperkinesis. One can introduce a list of symptoms or behaviors commonly associated with the syndrome to specify output. By the way, we are not so sure that what is reported as hyperactivity means the same thing to all observers. At any rate, the observed behavior is evaluated. Evaluation is an important part of the system. For example, there is some indication that hyperactivity is only a relevant dimension if the behavior observed has been negatively evaluated. Think of the difference between, "Oh, the youngster is a little restless but it doesn't bother us" to "That child is hyperactive and needs some medicine to be calmed down with."

Depending upon the conclusions reached during the evaluation, decisions are made concerning intervention. The range of intervention possibilities is tied to available services within a community. Parents or parent surrogates, school personnel and frequently health providers, usually physicians, make these decisions. Another important person involved in decision making is the child him or herself. Unfortunately the child is frequently left out when decisions are made; as indicated in a previous paper (Anderson, 1970) the child's decision to accept or reject an intervention approach may markedly influence the effectiveness and outcome of treatment.

There may or may not be unanimity regarding the decisions which are reached. Obviously if all persons involved in the system agree on the approach to treatment, then the likelihood of success increases. On the other hand, if there is a foot dragger then the probability of success must be diminished by

some decrement.

Whatever decisions are made act back on the environments and in turn influence the behavioral output. It should not be difficult to plug in your particular research area into the system. For example, we have been working on the academic environment and the internal environment. Ms. Rushing has recently initiated a study on family environment. We are convinced at this point that when one is concerned about treatment or even assessment all of these factors must be considered.

Finally, the WARD model, which is an acronym for Williamson, Anderson, Rushing and Dahl,* allows one to organize the research literature in a logical fashion.

The model has provided us with some overall direction but where have we actually gone.

First, a decision was made to concentrate our efforts on intervention with assessment as a secondary consideration. Second, our efforts in rural settings suggested that assessment and intervention focused in the schools would allow us to deal with a wider range of children than if we were tied to laboratory based procedures. Finally, earlier work had convinced us that we could not hope to work with children from minority backgrounds as long as our assessment was tied to the University Laboratory. What we did to resolve the problem of the laboratory bound assessment was to design a portable vigilance task. The slides show our laboratory based PDP8e computer and the test booth. Our new system is driven by an LVB corporation Digital Logic Circuit. The basic vigilance task is identical to that housed in the lab. The tape reader on the portable system reads the tape used on

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* Ms. Donnie Dahl who contributed to the development of this model was deceased in May, 1976.

the larger computer. The next slides show this portable system.

A measure of motoric restlessness is obtained while the child is seated in a secretarial type chair. The chair is equipped with three mercury switches. Any swivel movement, back and forth movement, or rocking type of movement closes a circuit. Circuit closures are recorded on the digital logic system as an activity count.

The total vigilance/restlessness system is shown in schematic form (Fig. 2) in the next slide.

At the present time the entire system is housed in a mobile lab (Fig. 3) which can be towed to a school site. The slide shows the lab at a school site in Levelland, Texas. In the mobile lab we can do the vigilance testing as well as regular psychometric appraisal. It is convenient because we do not have to utilize space within the school. However, our equipment is portable enough for us to take it into the school if necessary.

With this equipment we can obtain three dependent measures within the 30 minute test time.

1) correct detections
2) false alarms
3) activity count

Since reaction time has never been demonstrated in our studies to provide significant data we have not used it as a dependent measure.

It is now possible to categorize children into four distinct groups:

1) motorically restless plus attention deficit
2) motorically restless no attention deficit
3) no restlessness with attention deficit
4) no restlessness, no attention deficit

We are looking at groups 1 and 2 in our current studies; group 3 is a special group of hypoactive youngsters. Group 4 can be considered as normals or control youngsters.

We have tested enough children now to have developed age norms for the vigilance task. The activity counter is still relatively new but the spread of scores is so dramatic that it is easy to distinguish restless and non-restless youngsters. Gary Williamson recently tested a group of subjects to obtain the population for his dissertation. The restless group had an activity count range from 379 to 453; the non-restless group had an activity count range from 52 to 160.

In the event we want a sample of hyperactives, our standard research procedure within a school at this point is to ask teachers to complete the Conner's teacher rating scale for all children in grades two through six. Those children with Conner's scores above 15 are then screened on the vigilance/distractibility task. Those children who then meet our criterion for hyperkinesis are selected for further treatment.

We are finding out some intriguing and interesting things when teachers are asked to make ratings:

1. Of 327 children rated in two schools 28 or 8.6% were perceived as hyperactive. The popular statistics indicate that from 5 to 10% of children are hyperactive.
2. 79% of the 28 children selected through teacher ratings tested out as hyperkinetic.
3. In short, the teachers appear to be making fairly accurate judgements about children seen as disruptive in the classroom; most of them actually test out as hyperkinetic.

Some other interesting data is being compiled which we feel has great implications for this area. It relates to ethnic differences.

4. Of 327 children rated in the schools noted above, 222 or 68% were white, 17 or 5% were Black and 88 or 27% were Brown or Mexican-American. These were rural schools and we do not want to generalize beyond the rural setting.

5. As noted, 8.6% were rated as hyperkinetic. This group was divided as follows:

   71% White
   21% Black
    7% Brown

Please note that Mexican-Americans were essentially not perceived as hyperkinetic in spite of the fact that they composed 27% of the total population. A previous study (Anderson, Williamson, Sherman, 1977) demonstrated the same phenomena in a different rural school system. However, while the Mexican-Americans identified as learning disabled were quiet, they had severe attentional deficits. Let's say, from a behavioral standpoint they did not respond at a very high rate to the vigilance task.

What this amounts to is that we can't find populations of hyperkinetic Brown children. If one argues for a strict neurological-genetic interpretation of hyperkinesis then something is amiss with the Mexican-American children. Apparently, they don't have neurologic/genetic disturbances of the same magnitude nor the same incidence level as Blacks and Whites. A more reasonable approach, from our standpoint, is to argue that the hyperactivity may have a neurologic substrata but social learning determines how much behavior is manifested overtly. In other words, kids learn to be motorically restless or they learn how to inhibit the overt expression of restless tendencies. We see this restless or nonrestless behavior in first and second graders so that whatever

learning is going on occurs during early childhood, family bound experiences before the child gets into school.

Thus, if we want Mexican-American children in our rural setting who do not pay attention but are not motorically restless, we are going to have to devise new types of teacher rating scales. The Conner's Scale as well as most others emphasize hyperactivity, not hypoactivity. This presents another intriguing problem. We know we can train hyperkinetics to calm down and pay attention but we don't know if we can train the quiet ones to become more alert and pay attention. There are some other interesting implications:

1. If social learning plays a big role in determining how much motoric restlessness may be present who should be treated, the parents, teachers or children?
2. If hyperactive behavior is maintained by contingencies in the child's environment, then treating only the child produces very slow increments of change among those person's who have tended to maintain the behavior. Referring to the WARD model, it may be necessary to work on all fronts simultaneously to get maximum change.

We are beginning to suspect that the reason why the drug studies have been so discouraging, particularly on followup, is that they are inevitably designed to produce behavioral change only in the child. "Give some meds and quiet the little bugger down" -- it works. What would happen if one designed a drug study which:

1. gave the child meds in the accepted double blind procedure
2. worked with the parents
3. worked with, or retrained, the teachers.

These conditions could be varied. Our hunch is that the results would be quite different particularly in terms of long term effects. While the

meds may serve to expedite the overt behavioral output of the child; long term change would only take place if the family and school environments were modified.

Our work has carried us into treatment. We are attempting to follow our own words of wisdom. At this point we are manipulating the child's behavior with only informal attempts at teacher training. We have not systematically manipulated the teacher or parent variables. Last year at both SEPA and SWPA we described an attention training procedure. For those of you not familiar, the technique will be summarized.

1. Children identified as hyperkinetic are trained to "pay attention", either in a classroom or a space outside the resource room. We can work with three or four children at a time.
2. The youngsters are trained for 30 minutes, 3 times per week.
3. They each have a small light box on their desk. Whenever the light comes on the child is <u>not</u> paying attention (Fig. 4).
4. The system is controlled by an experimenter/observer.
5. Non-attending time is charted each day. The children construct their own record.
6. The children work on arithmetic during the training session.
7. Attempts are being made to keep accuracy and productivity records.

Recently we worked with 8 children in Whiteface and 6 in Levelland, Texas. Typical records of "Stocky" are shown in the next slides. Reports from teachers are quite favorable and after several replications of this procedure we know it works for White youngsters. I am always hesitant to present anecdotal material but teachers are reporting positive carryover. For example: Three children from Whiteface developed their own methods of attending to their classwork in the mainstream classroom. One of the children physically

isolated herself in the classroom whenever she was assigned seatwork. She moved her desk into a corner of the room so that she would face into the corner, away from her classmates. She then proceeded to perform her assignments without being distracted or restless. Another child developed a similar isolation procedure in a different part of the classroom; she utilized book shelves as her barrier from classroom distraction. As for "Stocky", teachers reported that he developed the ability to mentally tune out any form of sound while performing assigned seatwork. He became so focused on his work that he was impervious to interruption by students and teachers alike.

Two studies are currently in progress. The study by Gary Williamson is employing our attention-training procedure to explore suspected heterogeneity in the population of hyperkinetic children. Gary is predicting that only certain hyperkinetic children will respond to our attention training program, based on the theory of Marwit & Stenner (1972).

Cathy Rushing is looking at differences in mother-child interactions between hyperactive and non-hyperactive youngsters. She has mother-child pairs working together on puzzle type tasks under different conditions of distraction. The interactions are being observed. It is expected that the "hyperkinetic" mothers will be more attentive than the mothers of normal children.

It is our intention to follow the WARD model in future research. The area that interests us most at the present time is concerned with ethnic differences and rural/urban differences. Also we need to look at the generalizability of our attention training procedures. Theoretically it can be argued that the procedure helps the overaroused child to inhibit extraneous responding and to be more cautious in his approach. On the other hand, I

am not too sure that we can't just simply say that the child is being reinforced for paying attention by seeing his progress on a chart and by observing his increased productivity. The light simply provides him or her with a cue to nonattending which comes to be internalized. At this point the child develops a cognitive awareness of nonattending, ard if the pay off for attending is sufficient, he regulates his own behavior.

We are most interested in the response of this group to some of our ideas, and we would like to get some feedback regarding the directions that we are taking. Thank you.

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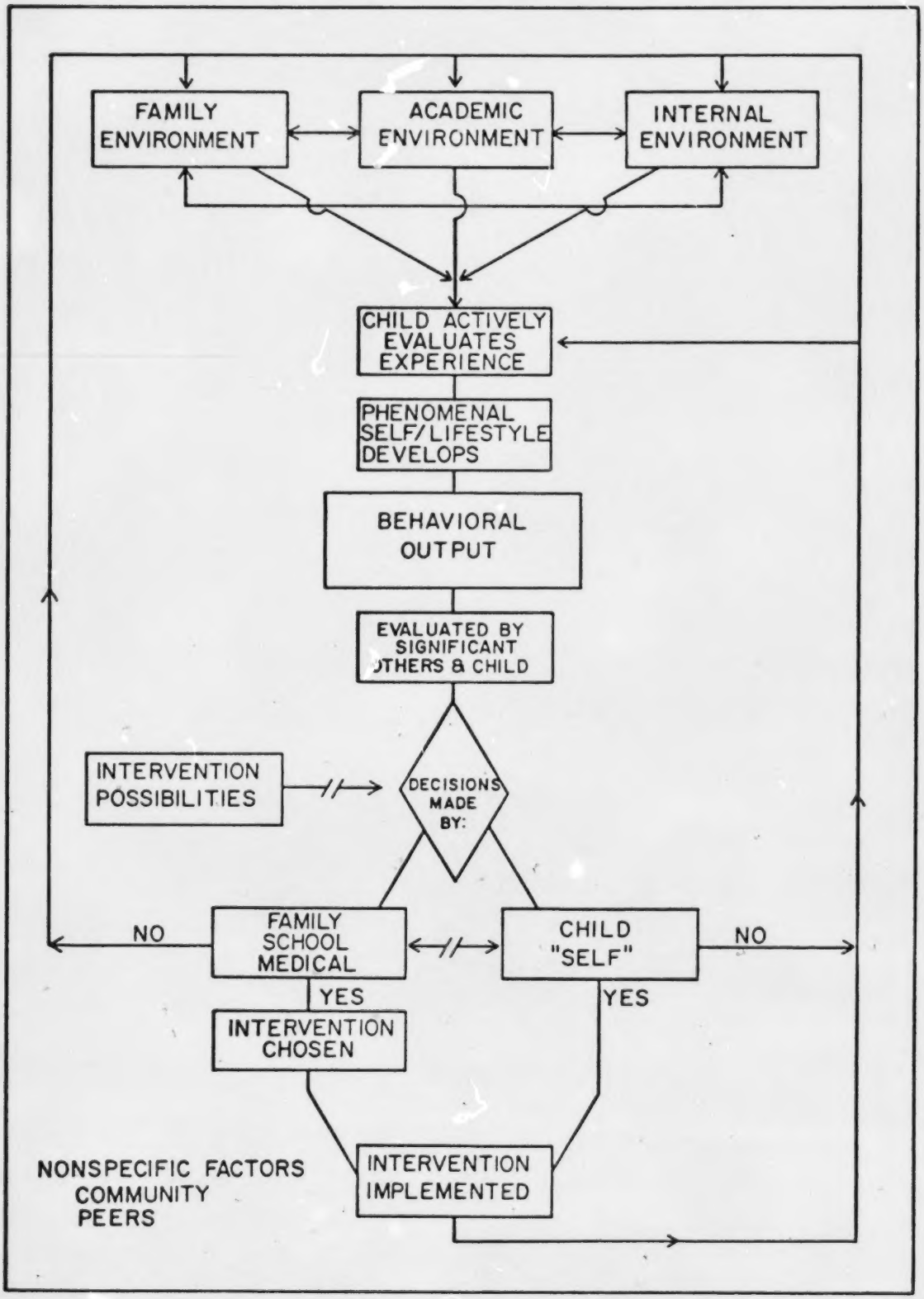
FAMILY ENVIRONMENT
ACADEMIC ENVIRONMENT
INTERNAL ENVIRONMENT
CHILD ACTIVELY EVALUATES EXPERIENCE
PHENOMENAL SELF/LIFESTYLE DEVELOPS
BEHAVIORAL OUTPUT
EVALUATED BY SIGNIFICANT OTHERS & CHILD
INTERVENTION POSSIBILITIES
DECISIONS MADE BY:
NO
FAMILY SCHOOL MEDICAL
CHILD "SELF"
NO
YES
YES
INTERVENTION CHOSEN
NONSPECIFIC FACTORS
COMMUNITY
PEERS
INTERVENTION IMPLEMENTED

Figure 1

VIGILANCE - ACTIVITY SYSTEM

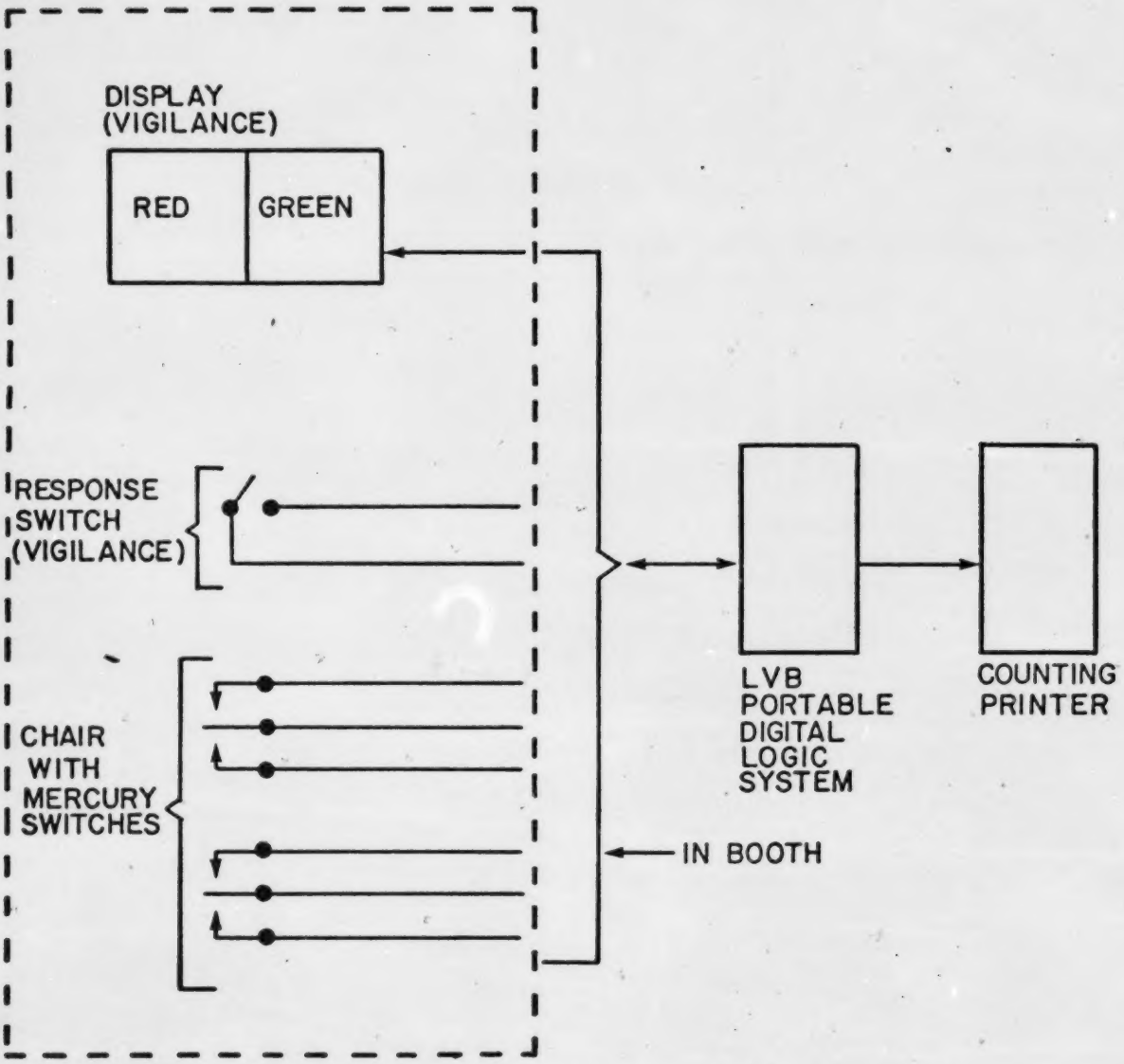

Figure 2 15

MOBILE LABORATORY

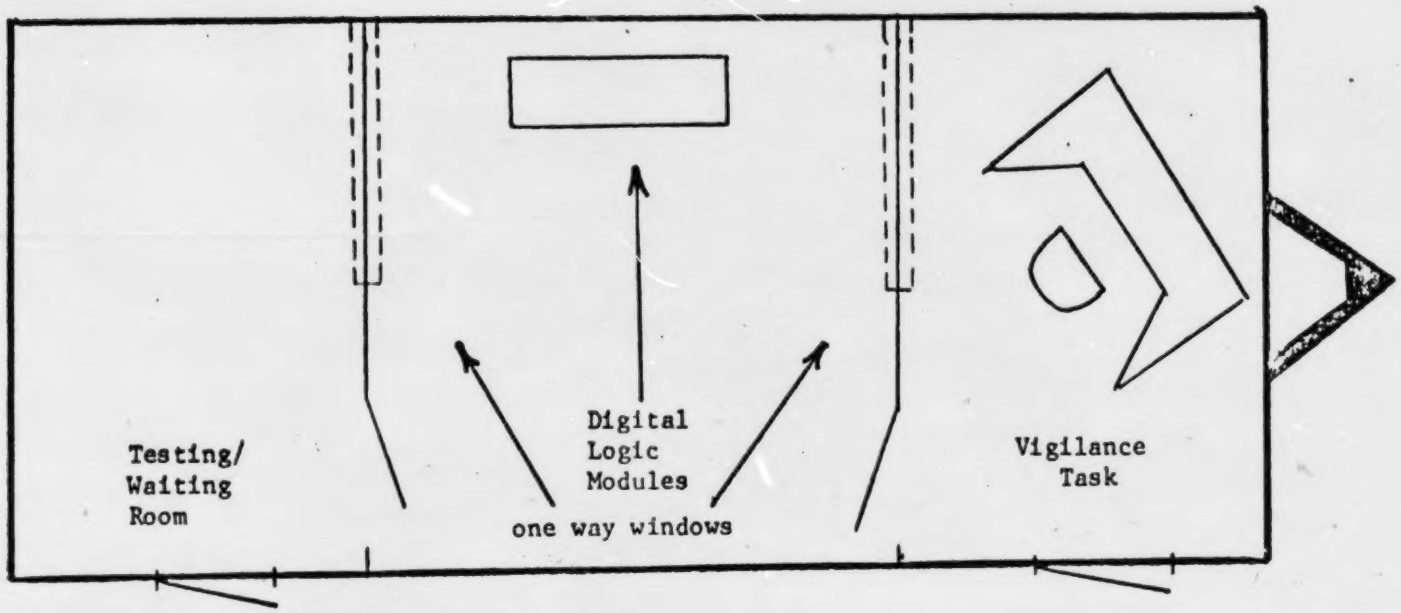

Figure 3

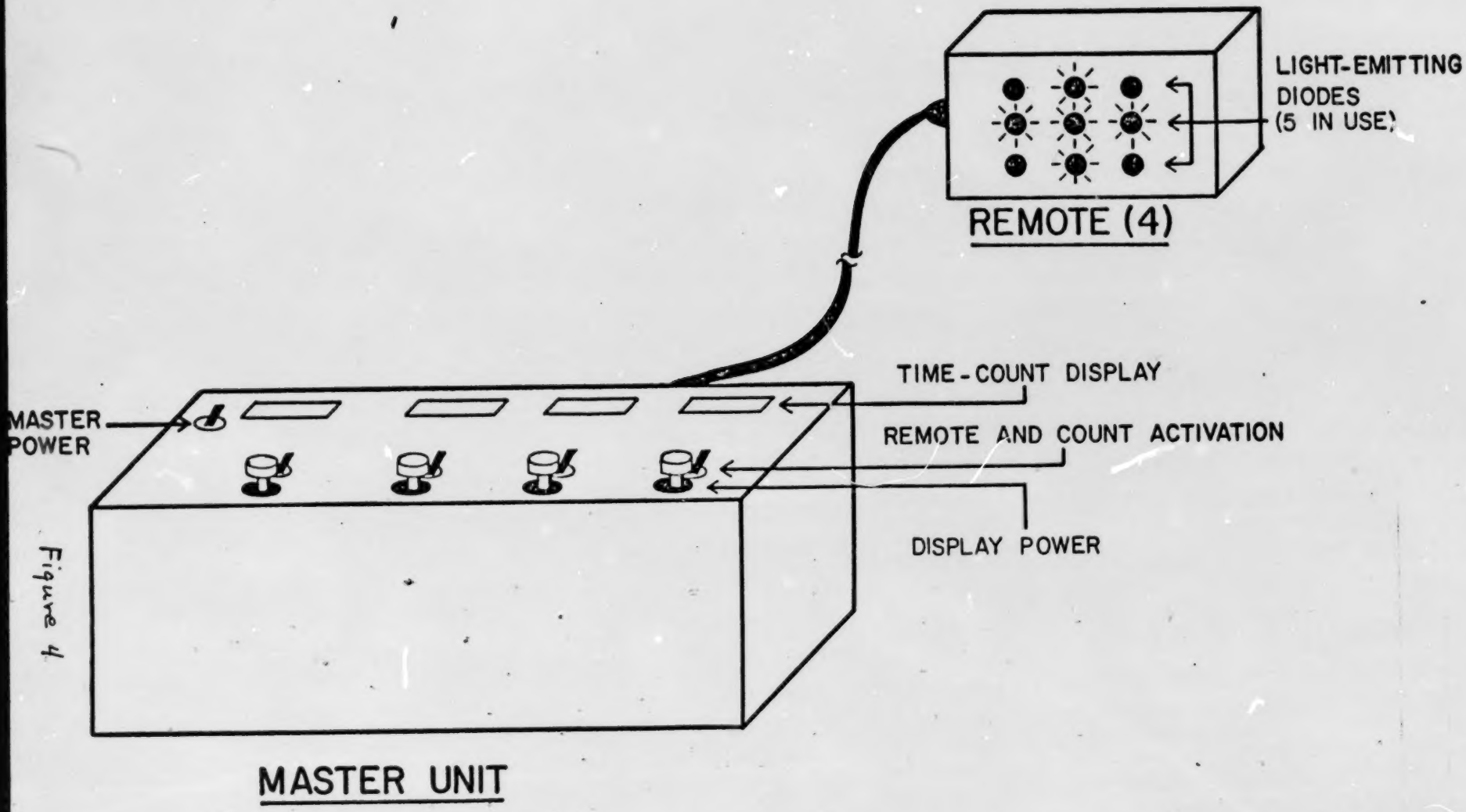
LIGHT-EMITTING
DIODES
(5 IN USE)
REMOTE (4)
TIME-COUNT DISPLAY
MASTER
POWER
REMOTE AND COUNT ACTIVATION
DISPLAY POWER
MASTER UNIT

Figure 4